

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Applicant's or agent's file reference 15297WO01		Date of mailing (day/month/year) 06 APR 2005
FOR FURTHER ACTION See paragraph 2 below		
International application No. PCT/US04/37257	International filing date (day/month/year) 08 November 2004 (08.11.2004)	Priority date (day/month/year) 07 November 2003 (07.11.2003)
International Patent Classification (IPC) or both national classification and IPC IPC(7): B01D 47/12, 53/14 and US Cl.: 96/290, 352, 416, 242		
Applicant SENREQ, LLC		

1. This opinion contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the opinion |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Frank M. Lawrence Telephone No. 571-272-0987 <div style="text-align: right;"> <i>Jean Proctor</i> Paralegal Specialist </div>
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Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Claims 3-6, 8-17 YES

Claims 1, 2, 7 NO

Inventive step (IS)

Claims NONE YES

Claims 1-17 NO

Industrial applicability (IA)

Claims 1-17 YES

Claims NONE NO

2. Citations and explanations:

Please See Continuation Sheet

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

Claims 1, 2 and 7 lack novelty under PCT Article 33(2) as being anticipated by US 4,661,130 A (EBELING et al). EBELING et al teach an absorber column comprising a vessel having an interior, a lower end, an upper end, an inlet port (20) for receiving exhaust, and an outlet port (22), a liquid absorbent in the vessel for removing water from the exhaust, a diffuser (50) immersed in the absorbent in the lower end of the vessel for receiving the exhaust gas from the inlet and creating gas bubbles, a liquid outlet (44) in the bottom of the tank to allow drainage, surface contact balls (54) in the liquid, and a nozzle assembly (60) for spraying absorbent into the vessel while the bubbles rise through the absorbent (see figures, col. 2, lines 30-37, col. 3, lines 15-47, col. 4, lines 5-55).

Claims 1 and 2 lack novelty under PCT Article 33(2) as being anticipated by US 2,070,578 A (BOWMAN). BOWMAN teaches an absorber column comprising a vessel having an interior, a lower end, an upper end, an inlet port (17) for receiving exhaust, and an outlet port (19), a washing liquid in the vessel for removing contaminants from the exhaust, a diffuser (4) immersed in the liquid in the lower end of the vessel for receiving the exhaust gas from the inlet and creating gas bubbles, a liquid outlet (7) in the bottom of the tank to allow drainage, and a nozzle assembly (12) for spraying washing liquid into the vessel while the bubbles rise through the liquid (see figure, col. 1, line 16 to col. 2, line 6).

Claims 8-11, 16 and 17 lack an inventive step under PCT Article 33(3) as being obvious over EBELING et al in view of US 4,247,532 A (SALETAN et al). EBELING et al disclose all of the limitations of the claims except that the tank and liquid are configured to retain at least a portion of the small gas bubbles for approximately 4-10 seconds and that there is a cooling unit connected to the tank to allow at least a portion of the solution to flow out from the tank, through the unit, and back into the tank. SALETAN et al disclose a counter current contact tower (31) with an external heat exchanger (33) for cooling a portion of the contact liquid in the tower (see figure 2, col. 7, lines 23-64). It would have been obvious to one having ordinary skill in the art at the time of the invention to use a cooling unit in the system of EBELING et al in order to provide a means for causing further condensation and removal of contaminants. It would also have been obvious to modify the contact time of the bubbles in the tank to provide an optimum level of gas/liquid contact for removal of contaminants without unnecessarily prolonging the process.

Claims 3 and 12 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of US 3,465,504 A (OROPEZA et al). The primary and secondary references disclose all of the limitations of the claims except that the tank includes an inspection port for maintenance or observation of the tank interior. OROPEZA et al disclose a gas/liquid contact column (11) having an observation port (33) (figure 1, col. 2, lines 40-41). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the contact system of the prior art by including an observation port in order to provide a means to observe the operation status of the tower.

Claims 4, 5, 13 and 14 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of US 3,957,464 A (TELLER). The primary and secondary references disclose all of the limitations of the claims except that the solution includes brine and caustic soda. TELLER discloses a process for scrubbing contaminants from a gas stream using a brine solution including sodium hydroxide (col. 6, lines 8-15). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the contact system of the prior art by using a scrubbing

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

solution of brine and caustic soda in order to facilitate removal of acid gases.

Claims 6 and 15 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of US 2002/0110511 A1 (KLINGSPOR et al). The primary and secondary references disclose all of the limitations of the claims except that the solution includes calcium hydroxide, calcium carbonate, or sodium bicarbonate. KLINGSPOR et al disclose a gas scrubber that uses conventional scrubber scrubber compositions such as calcium carbonate (paragraph 0006). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the contact system of the prior art by using a calcium carbonate scrubber solution in order to provide desulfurization of the exhaust gas.

Claims 1-17 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.